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**An Evaluation of the Performance Metrics and Financial Trajectory of the Pradhan Mantri Fasal Bima Yojana (PMFBY) in India from 2016 to 2021**

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**Abstract**

The research aims to examine Pradhan Mantri Fasal Bima Yojana's operational and financial effectiveness in India from 2016 to 2021. The study finds that many farmers enrol in PMFBY during the Kharif season. It highlights how Covid-19 reduced the accessibility to the scheme but there was a 1% increase in the farmers covered during 2020-2021. The beneficiary ratios are also less than 50% throughout the years which signifies that the farmers who benefited under the scheme are almost less than half of the total farmers enrolled. During 2020-2021, the claims paid to gross premium ratio was 0.524 which signifies that insurance companies paid claim amounts equal to half that of the gross premium. The gross premium to sum assured ratio is greater than the claims paid to sum assured ratio every year, this shows that the scheme is financially viable and it can be concluded that the insurance companies gained at the expense of farmers. The research proceeds to point out that PMFBY has been on a declining trend for the past couple of years. A few suggestions are given in the study to help revive the scheme and thereby benefit the farmers of India.

**Keywords:** gross premium, claims paid, performance analysis, benefitted farmers.

**1. Introduction**

A significant portion of India's workforce is engaged in agriculture and associated sectors. However, agriculture in India is often characterized as gambling with monsoon winds. Nearly the entire nation relies on sufficient and timely precipitation to facilitate optimal crop growth and yield. This requires farmers to mitigate uncertainties such as drought, flood, pest attack etc., effectively. In this regard, the government has implemented several services to assist farmers, with crop insurance being the most significant one.

Pradhan Mantri Fasal Bima Yojana (PMFBY) is a government-sponsored crop insurance scheme that aims to support sustainable production in the agriculture sector by way of providing financial support to farmers suffering crop loss/damage arising out of unforeseen events. Its other objectives are stabilising the income of farmers to ensure their continuance in farming,

encouraging farmers to adopt innovative and modern agricultural practices, and ensuring the flow of credit to the agriculture sector; which will contribute to food security, crop diversification, and enhancing growth and competitiveness of the agriculture sector besides protecting farmers from production risks (Pradhan Mantri Fasal Bima Yojana - Crop Insurance | PMFBY - Crop Insurance, n.d.).

Evaluating the performance of the scheme since its implementation will provide an accurate picture of whether the scheme has assisted the farmers in mitigating risks associated with agriculture. This study aims to assess the performance metrics and financial trajectory of Pradhan Mantri Fasal Bima Yojana (PMFBY) in India from 2016 to 2021. The study is detailed and exhaustive as it considers the cropping seasons (Kharif and Rabi) from 2016 to 2021 and evaluates several parameters such as farmer's participation, area covered, sum insured, claims paid etc.

This study aims to furnish a comprehensive analysis of the existing scheme, identifying both its strengths and deficiencies. By doing so, it intends to assist policymakers in formulating practical and effective solutions that will ultimately ensure the scheme serves the interests of small and marginal farmers in India. The findings of this research can be utilized to enhance awareness regarding such schemes and their potential benefits for farmers, particularly in the context of the challenges posed by climate change.

## **2. Related Literature and Studies**

The Review of the Literature consists of an assessment of various articles and reports on PMFBY in India. This section summarises an assortment of research under various areas of study, probing into their research gaps and findings related to PMFBY. It consists of articles about crop insurance in India, its efficiency, and its performance along with empirical data analysis. The literature review also consists of journal articles that evaluate the farmer's attitudes and perceptions of the scheme PMFBY.

A study titled "Pradhan Mantri Fasal Bima Yojana and Its Socio-Economic Determinants: A Study Based on Growers' Perception After Kharif 2021 In India" was conducted by Mukherjee, T., & Chattopadhyay, A. (2022) to investigate and highlight the perceptions and attitudes of growers towards PMFBY. Socioeconomic factors such as farmers' education, the size of their farms, their monthly family income, their awareness of PMFBY, and their access to PMFBY have a favourable effect (Mukherjee and Chattopadhyay, 2022). The study concludes that young growers with little experience are optimistic about risk mitigation with PMFBY. Larger farmland owners are more likely to use crop insurance. Due to the perception that crop insurance premiums are expensive, growers with higher household incomes are more likely to engage in PMFBY. Male producers predominate, and they are more willing to take calculated risks than female farmers.

Research was undertaken by Paulraj, A. P., & Easwaran, N. (2020) in their work "Evaluation of 'Revamped' Crop Insurance Pradhan Mantri Fasal Bima Yojana (PMFBY) among Paddy Farmers in Tamil Nadu, India" to evaluate the program's effectiveness among paddy farmers in

Tamil Nadu during 2019. The biggest issue with the program seen by insured farmers was the delay in compensation. Credibility was the main reason why uninsured farmers were not enrolled. PMFBY was introduced with the promise of quick claim repayment, but the study revealed that approximately 25% of farmers reported that claim amount settlement took longer than expected. Approximately 22% of respondents cited a lack of compensation as a problem.

Data was gathered from a sample of 90 farmers enrolled in the National Agricultural Insurance Scheme (NAIS) across three districts in Tamil Nadu by Mani, K., Chandrasekaran, M., and Selvanayagi, S. (2012), and the paper “Adaptability of crop insurance schemes in Tamil Nadu” was published. The number of Tamil Nadu farmers enrolled in NAIS in 2005–06 was 1.36 lakh, which represented 1.74 per cent of all agricultural households in the state, much below the national average. One of the objections made by farmers of Tamil Nadu about crop insurance programs was that the amount of money needed to cover the insured amount was considerably less than the price of cultivating. The evidence from the study demonstrates that moral hazard and adverse selection issues brought on by asymmetric information are at least partially to blame for agriculture insurance's poor performance.

The perception of farmers regarding PMFBY within Salem District, Tamil Nadu, is assessed by Kumari, S. A., Rani, R. J., Premavathi, R., & Sridevy, S. (2021) in the academic paper “Farmer’s Perception towards Pradhan Mantri Fasal Bima Yojana in Salem District.” All types of farmers, including small, marginal, and large farmers, received loans from the bank, making it simple for the bank and for the farmers to return the premium amount. It is possible to deduce that farmers want the government to identify all the crops covered by PMFBY because they have a favourable opinion of the program and it can be concluded that farmers have a positive perception of PMFBY.

A paper titled “Prediction of Farmers' Access to Pradhan Mantri Fasal Bima Yojana (PMFBY) Scheme using Discriminant Analysis” was published by Santhi, P., & Sangeetha, S. (2020). The awareness and access that farmers have to the scheme are analyzed in the paper. The farmers are generally aware of the elements of the PMFBY system to a modest degree. More features were known to non-loanee farmers than to loanee farmers. The non-loanee farmers' ability to participate in the program was influenced by the availability of support services in the villages. The loanee farmers were more interested in learning about risk coverage, sum insured, and crop yield estimation through crop-cutting experiments since they were required to participate in the program compulsorily.

In the research titled “Factors influencing adoption of Pradhan Mantri Fasal Bima Yojana (PMFBY) in Tamil Nadu,” the determinants affecting the acceptance of Pradhan Mantri Fasal Bima Yojana (PMFBY) among insured farmers in Tamil Nadu are investigated by Lakshmanan, P., & Ashok, K. R. (2019). Financial stability provided by crop insurance was considered the most significant element by farmers that influenced the loanee farmer's adoption of PMFBY. The absence of opportunities for crop diversification was the second significant reason influencing crop insurance adoption. The subsidised cost for farmers purchasing crop insurance also influenced their decision to obtain crop insurance. Sixty per cent of non-loanee farmers also

preferred to avail of crop insurance directly from the insurance company (Lakshmanan and Ashok, 2019)

From the review of the literature, it can be concluded that the PMFBY is beneficial to farmers to an extent but still has major disadvantages such as expensive premiums, procedures complexity and high financial risks. This study further adds to the field by analysing the scheme's financial trajectory and by carrying out a comprehensive performance evaluation of the scheme. This will help in finding out what makes the small and marginal farmers apprehensive to take on this scheme. The variables such as farmers insured, area insured, sum insured and gross premium are taken as basic criteria for evaluation.

### **3. Research Methodology**

Secondary data on the number of farmers insured, the area covered, the premium, the sum insured, and the claims paid were collected from the official government website of PMFBY, AIC OF INDIA LTD. and the website Indiastat (e-resource).

The physical performance of the scheme gives the general outlay of the performance of PMFBY in various parameters over the years. Financial performance will measure the overall financial viability of the scheme and give information on whether the farmers benefited from it. The formulas listed below were used to analyse the financial trajectory of the scheme.

Formulas:

- Claims paid to gross premium ratio =  $\text{Claim paid} / \text{Gross premium collected}$
- Claims paid to sum insured ratio =  $(\text{Claims paid} / \text{Sum assured}) \times 100$
- Gross Premium to sum assured ratio =  $(\text{Gross premium paid} / \text{Sum assured}) \times 100$
- Beneficiary ratio =  $(\text{No. of farmers benefited} / \text{Total number of farmers insured}) \times 100$

The formulas were sourced from a few other research papers, Performance of Pradhan Mantri Fasal Bima Yojana (PMFBY) in the Hyderabad-Karnataka (H-K) region (Cariappa et al.,2018) and the Performance analysis of Pradhan Mantri Fasal Bima Yojana (PMFBY) in Rajnandgaon district of Chhattisgarh state (Mandavi et at.,2022).

Table 1. Data Review for the years 2016 to 2021

S.no	Indicators	Variables	Units	Source
1	Farmers participation	Farmers covered in Kharif season, Rabi season, Total	Number of persons	Indiastat
2	Area covered	Area covered in Kharif season, Rabi season, Total	Hectares	Indiastat
3	Premium	Gross premium, Farmers premium, GoI Premium share, State Govt. Premium share	Rupees	Indiastat
4	Sum insured	Sum insured in Kharif season, Rabi season, Total	Rupees	Indiastat
5	Claims	Claims paid	Rupees	Indiastat
6	No. of farmers benefited	No. of farmers benefited in Kharif season, Rabi season, Total	Number of persons	Indiastat

Source: Author’s compilation.

**4. Results and Discussion**

Table 2: Data Compilation for the years 2016-2021

Farmers’ Participation (Number of persons)				
Year	Kharif Season	Rabi Season	Total	% Increase or decrease
2016-2017	3,92,22,405	1,70,48,848	5,62,71,253	
2017-2018	3,42,76,361	1,69,65,514	5,12,41,875	-8.938
2018-2019	3,31,19,255	2,25,10,383	5,56,29,638	8.563
2019-2020	4,13,88,787	1,83,70,699	5,97,59,486	7.424
2020-2021	4,16,45,192	1,89,77,686	6,06,22,878	1.445
Total	18,96,52,000	9,38,73,130	28,35,25,130	

Area insured (Hectares)				
Year	Kharif Season	Rabi Season	Total	% Increase or decrease
2016-2017	3,64,73,145	1,84,46,774	5,49,19,919	
2017-2018	3,13,08,486	1,74,37,552	4,87,46,038	-11.242
2018-2019	3,07,12,052	1,99,83,163	5,06,95,216	3.999
2019-2020	3,18,99,514	1,63,95,703	4,82,95,217	-4.734
2020-2021	2,79,36,885	1,55,32,221	4,34,69,106	-9.993

Total	15,83,30,082	8,77,95,413	24,61,25,496		
Sum insured (in lakhs of Rs)					
Year	Kharif Season	Rabi Season	Total	% Increase or decrease	
2016-2017	1,23,97,913	68,84,113	1,92,82,026		
2017-2018	1,15,81,366	74,74,582	1,90,55,948	-1.172	
2018-2019	1,29,41,497	87,54,023	2,16,95,520	13.852	
2019-2020	1,31,63,488	70,45,873	2,02,09,361	-6.850	
2020-2021	1,11,54,071	78,95,528	1,90,49,599	-5.739	
Total	6,12,38,335	3,80,54,119	9,92,92,454		
Claims paid (in lakhs of Rs)					
Year	Kharif Season	Rabi Season	Total	% Increase or decrease	
2016-2017	930344	584424	15,14,768		
2017-2018	1682966	342519	20,25,485	33.716	
2018-2019	1665164	815032	24,80,196	22.449	
2019-2020	1892507	414451	23,06,958	-6.985	
2020-2021	1157790	413039	15,70,829	-31.909	
Total	7328771	2569465	98,98,236		
Number of farmers who benefited under PMFBY					
Year	Kharif Season	Rabi Season	Total	% Increase or decrease	
2016-2017	1,01,33,944	38,04,924	1,39,38,868		
2017-2018	1,35,30,904	26,07,969	1,61,38,873	15.783	
2018-2019	1,25,52,655	79,72,894	2,05,25,549	27.181	
2019-2020	1,74,11,499	36,30,271	2,10,41,770	2.515	
2020-2021	99,35,115	44,79,887	1,44,15,002	-31.493	
Total	6,35,64,117	2,24,95,945	8,60,60,062		
Premium collected (in lakhs of Rs) for PMFBY					
Year	Farmers' Premium	Goi Premium (Share)	State Premium	Govt. Premium (Share)	Gross Premium
2016-2017	3,68,094	8,04,447	8,34,040		20,06,581
2017-2018	3,74,164	9,15,684	9,34,079		22,23,927

2018-2019	4,15,301	10,94,372	11,28,984	26,38,657
2019-2020	3,92,967	12,09,474	12,58,444	28,60,885
2020-2021	3,67,619	12,42,674	13,85,762	29,96,055
Total	19,18,145	52,66,651	55,41,309	1,27,26,105

Financial Performance of PMFBY in India

Year	Claims paid to the Gross premium ratio	Claims paid to Gross sum assured ratio	Gross premium to Gross sum assured ratio	Beneficiary ratio
2016-2017	0.755	7.86%	10.41%	24.77%
2017-2018	0.911	10.63%	11.67%	31.50%
2018-2019	0.94	11.43%	12.16%	36.90%
2019-2020	0.806	11.42%	14.16%	35.21%
2020-2021	0.524	8.25%	15.73%	23.78%

Source: Computed from secondary data, Indiatat.

Farmers Participation:

A total of 28.35 crore farmers' applications—from Kharif 2016 to Rabi 2021—have been received since the initiative PMFBY began. In the Kharif season of 2016 to 2021, a total of 18.96 crore farmers and in the Rabi season a total of 9.38 crores of farmers were covered under this scheme. There was a decline in the participation of the farmers from 2017 to 2018 by 8.93% but from the next year onwards i.e., 2018, it can be observed that there has been a small increase in the percentage of farmers covered. It can also be noted that there was only a 1.445% increase during the pandemic year which is from 2020 to 2021. Table 2 shows the detailed performance of farmers' participation under PMFBY from 2016 to 2021.

Area Covered/ Insured:

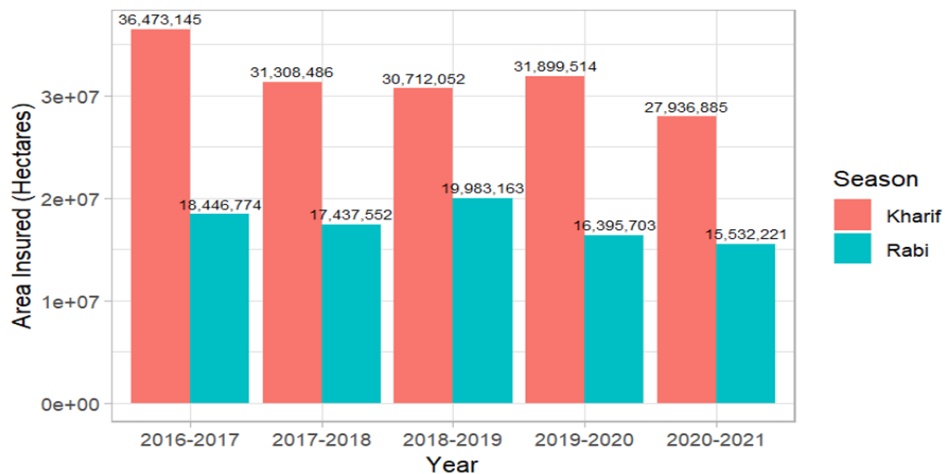


Figure 1: Area insured in PMFBY from 2016 to 2021

Source: Computed from secondary data, Indiatat.



From Kharif 2016 to Rabi 2021, the total area insured under PMFBY is 24 crore hectares. In the Kharif season of 2016 to 2021, 15 crore hectares of land were insured and 8 crore hectares of land were insured during the Rabi season. It can be observed that there was a decline in the area covered from 2017 to 2018 by 11.24%. From 2018 to 2019, the area covered increased by almost 4%. But again, it can be noted that there has been a decline of 4.73% and 9.993% during the years 2019 to 2020 and 2020 to 2021. There has been a significant decline in the proportion of areas insured from 2020 to 2021. Table 2 gives the details of the area insured under PMFBY from 2016 to 2021. Figure 1 illustrates the area insured under PMFBY from 2016 to 2021 for both Kharif and Rabi seasons. There has been a significant decrease from 3.1 crore hectares to 2.7 crore hectares in the area insured during the Kharif season and from 1.6 crore hectares to 1.5 crore hectares during the Rabi season of 2020 to 2021.

*Sum Insured:*

From the start of the scheme PMFBY i.e., Kharif 2016 to Rabi 2021, a total of Rs 9.92 crore lakhs have been insured all over India. In the Kharif season of 2016 to 2021, a total of Rs 6.12 crore lakhs and in the rabi season a total of Rs 3.80 crore lakhs have been insured. It can be observed that there had been a decline in the percentage of the sum insured during the years 2017 to 2018 by 1.17%. But during the year 2018 to 2019, the amount of sum insured increased by 13.85%. Then again there has been a declining trend since then up until 2021. From 2020 to 2021 the percentage decrease was up to 5.73%. Table 2 gives the details of the sum insured under PMFBY from 2016 to 2021 for both the Kharif and Rabi seasons.

*Farmers' Premium, Government's Share and Gross Premium:*

The farmer's share in the premium from 2016 to 2021 was Rs 19,18,145 lakhs, the Indian government paid Rs 52,66,651 lakhs and the state government paid Rs 55,41,309 lakh, so the total gross premium comes to Rs 1.27 crore lakhs. It can also be noted that the state government has proportionately more share in the premium than the central government throughout the years. The farmer's share has been the lowest one until now. Over the years it can be observed that only the GoI share in premium, the state government's share in premium and the gross premium have increased. While all the other premiums were increasing, the farmer's premium increased till 2018-2019 and had a declining trend from then onwards. Table 2 gives the details of the premiums under PMFBY from 2016 to 2021.

*Claims Paid:*

The claims paid from the year 2016 to 2021 were Rs 98,98,236 lakhs. There has been a significant reduction in claims paid during 2020-2021. Claims paid decreased from Rs 23,06,958 lakhs to Rs 15,70,829 lakhs during 2020-2021 which is almost the same amount as that in 2016-2017. There was a decrease of around 31.90% during the same year. Table 2 gives the details of the claims paid under PMFBY from 2016 to 2021.



*Farmers Benefited:*

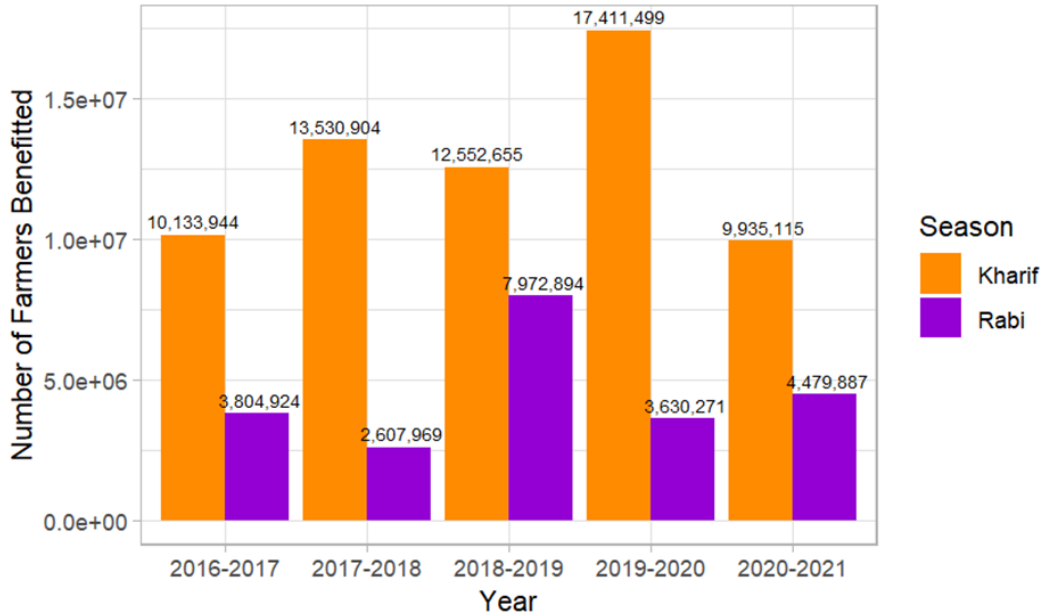


Figure 2: Number of farmers who benefited under PMFBY from 2016 to 2021

Source: Computed from secondary data, Indiatat.

From the start of the scheme PMFBY i.e., Kharif 2016 to Rabi 2021, a total of 8.60 crores of farmers have benefited from this scheme. In the Kharif season of 2016 to 2021, 6.35 crores of farmers benefited from the scheme and in the Rabi of 2016 to 2021, a total of 2.24 crore farmers of India benefited from PMFBY. It can be observed from Table 2 that the number of farmers who benefited significantly increased between 2016 and 2017 by 15.78%. For the years 2018 to 2019, there was an increase in the percentage of farmers by 27.18%. During the pandemic which is from 2020 to 2021, there was a significant decrease in the percentage of farmers who benefited which was about 31.49%. Figure 2 illustrates the number of farmers who benefited under PMFBY from 2016 to 2021 for both the Kharif and Rabi seasons. It can be noted that the number of farmers who benefited during the Kharif seasons throughout all 5 years was significantly greater than that of the Rabi season. But during the year 2018 to 2019, the proportion of farmers who benefitted in the Kharif season and Rabi seasons were quite similar i.e., the farmers who benefitted in Kharif were 1.74 crores and those in the Rabi season were about 79 lakhs.

*Financial Performance:*

The financial performance of PMFBY from 2016 to 2021 in India is presented in Table 2, in terms of claim-to-premium ratio, claim-to-sum assured ratio, premium-to-sum assured ratio, and beneficiary ratio. The claims paid to gross premium ratio was highest (0.94) during 2018-2019 and lowest (0.524) during 2020-2021. The claim-to-sum assured ratio was highest (11.43%) during the year 2018-2019 and lowest (7.86%) during the starting years of the scheme. The gross premium to sum assured ratio was highest (15.73%) during 2020-2021 and lowest (10.41%)

during 2016-2017. The beneficiary ratio was highest (36.90%) in 2018-2019 and lowest (23.78%) during the pandemic from 2020 to 2021.

The beneficiary ratio is derived by dividing the total number of farmers who benefited by the total number of farmers who were insured under a specific scheme (Kaur S et al., 2021). The claim premium ratio, on the other hand, is computed as the ratio of claims paid out versus the gross premium collection amount under a specific scheme (Kaur S et al., 2021). The beneficiary ratio was steadily increasing from 2016 till 2018 but it started dropping from 2019 onwards. The beneficiary ratios are also less than 50% throughout the years which signifies that the farmers who benefited under the scheme are almost less than half of the total farmers insured.

The claims paid to gross premium ratio is less than unity for all the years, which implies that the claims paid by the insurance companies were less than the gross premium paid by farmers and the government (Kaur S et al., 2021). This implies that the insurance company is making a profit. During the years 2017-2018 and 2018-2019, the ratio was 0.911 and 0.940 which shows that during these years the claims paid and gross premium were almost equal yet the claims paid were less than the gross premium. During 2020-2021, the ratio was 0.524 which signifies that insurance companies paid claim amounts equal to half that of the gross premium.

The gross premium to sum assured ratio is greater than the claims paid to sum assured ratio every year, this shows that the scheme is financially viable. The magnitude of gain can be seen by comparing these two ratios. From 2020 to 2021, the gross premium to sum assured ratio (15.73%) was greater than the claims paid to sum assured ratio (8.25%) which implies that the scheme was viable i.e., there was a 7% gain in the operation of the scheme (Raju and Chand, 2008).

### **5. Summary findings**

The Kharif crops are becoming more challenging and unpredictable to grow due to their dependence on rain, so many farmers are turning to crop insurance as a risk-reduction strategy. This is the reason why the number of farmers covered, area insured, sum insured, and thereby farmers benefited, are all greater during the Kharif season than during Rabi.

Less than half of the enrolled farmers received benefits from the years 2016 to 2021. This demonstrates that PMFBY did not help the farmers as expected. The low number of beneficiaries could be due to various reasons such as lack of awareness, complicated procedures, and inadequate compensation.

The scheme was profitable because the insurance companies' gross premiums collected exceeded the amount of claims settlements given to the farmers. It is possible to draw the conclusion that the insurance companies gained but at the expense of farmers.

### **6. Recommendations**

Establishing a different bank as an insurance firm solely for crop insurance to manage all crop insurance cases, premium collecting, and claim settlement in India will help ease this issue

(Tiwari et al., 2020). This firm will work under the direction of the National Bank for Agricultural and Rural Development (NABARD).

Farmers should have access to a range of insurance solutions tailored to their particular geographic and financial demands. This is crucial because the scheme does not perform uniformly across India. Policies should be introduced considering the state's geographical region and economic background.

A greater reliance on technology will lessen moral risks and manipulation, speed up claim processing, simplify damage assessment, improve transparency, and inspire more faith in crop insurance among farmers.

As it can be noted from the analysis performed, the farmers were not the ones who benefited from the scheme but it was the insurance companies that earned a profit. The scheme should focus more on aiding and helping farmers during distress.

The scheme's existence and advantages are barely known to the uneducated or illiterate farmer. Large-scale pilot studies must be carried out as a crucial component of policy planning to develop effectiveness.

### **7. Limitations of the study**

The study primarily focuses on the time frame from 2016 to 2021, which may not provide insights into the scheme's long-term effectiveness or performance beyond this period.

The research provides a holistic view but might not adequately account for regional differences in agriculture practices, climate conditions, and levels of awareness about PMFBY, which could affect farmers' participation and experiences with the program.

### **8. Conclusion**

Overall, the scheme started strong in Kharif in 2016 and effectively aided the farmers until 2018 - 2019, in almost all aspects. From 2019 onwards PMFBY slowly started to show a declining trend. The pandemic led to lockdowns across the country which hampered accessibility to the scheme, but there was a 1% from the previous year in the number of farmers covered. The pandemic had a severe impact on other factors such as the area insured, the number of farmers who benefited, the sum insured and claims paid, resulting in a decline in all these factors.

To improve performance, it is essential to engage farmers in the decision-making process and ensure their needs are adequately addressed. This can be accomplished through regular feedback mechanisms and consultations with farmer organizations. Engaging farmers can enhance communication channels between farmers and policymakers or researchers, paving the way for more rapid dissemination of information and new-age technology. Collaborative decision-making can help in developing tailored solutions that are more suited to local contexts, rather than a one-size-fits-all approach that may not work effectively in varied agricultural environments.

The government should implement modern and comprehensive policies that support both the efficient operation of the scheme and the welfare of the farmers. This will in turn increase profits earned by farmers leading to further investments which in turn improves the productivity of Indian agriculture. Subsidies and loan waivers serve as temporary solutions for Indian farmers. For long-term benefits, government policies and schemes need to be designed with a focus on sustainable growth and support for the agricultural sector. This approach will ensure that farmers receive the assistance and support they need to thrive in the long run.

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